

rotation about which the plate rotates, the line passing through the center of a plane of the plate.

79. (New) A fluid filtering device comprising:
- a) a plurality of filtering wells within a plate, each well including a membrane for processing a fluid; and
 - b) an angling mechanism that sets the angle of the membranes at a respective non-zero angle relative to the plane of the plate, the respective angles decreasing as the position of the respective wells increases relative to a line perpendicular to an axis of rotation about which the plate rotates, the line passing through the center of a plane of the plate.

REMARKS

Claims 38-45 and 50-77 are currently pending. All claims stand rejected. In response, certain claims have been amended and new claims 78 and 79 have been added to more distinctly and clearly claim the Applicants' invention. The rejections are also traversed. Reconsideration and further examination are respectfully requested.

Claim Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 38-40, 52, 60, 64-71, and 75-77 have been rejected under 35 U.S.C. § 112, second paragraph. In response, references to "a centrifuge" in claims 38 and 52 have been removed, and claim 60 has been amended to properly refer to a "device" in the preamble. Because claims 39, 40, 64-71, and 75-77 depend from claim 38, all claims now particularly point out and distinctly claim the subject matter which the Applicants' regard as the invention. The rejections under 35 U.S.C. § 112, second paragraph are therefore overcome.

Reconsideration of the rejections under 35 U.S.C. § 112, second paragraph is respectfully requested.

Claim Rejections under 35 U.S.C. § 103

Claims 38-45 and 50-77 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,665,247 to Valus et al. in view of U.S. Patent 4,722,792 to Miyagi et al. It is respectfully submitted that the rejections cannot be properly applied to the amended claims.

The Applicants' invention is directed to a fluid filtering device having a plurality of filtering wells positioned in a plate (10) as shown, for example, in Figure 11. Each well includes a membrane (26) that processes the fluid. In some embodiments, for example, as recited in claim 41, an angling mechanism (36) sets the angle of one or more membranes at a non-zero angle relative to the plane of the plate. The angles of the membranes can decrease as the position of the respective wells increases relative to a line (for example, 35 of Figure 6) perpendicular to an axis of rotation (for example, 34 of Figure 6) about which the plate rotates, with the line passing through the center of a plane of the plate, as required by new claim 79.

In other embodiments, as shown in Figure 6 and as stated in amended claim 38 and new claim 78, the angling mechanism, such as a wedge (38), sets the angle of the membranes (26) within the plurality of filtering wells at a non 90° angle relative to the line (35) perpendicular to the axis of rotation (34). In these embodiments, the membranes (26) can be coplanar with the plate (10), as required by new claim 78.

In typical prior art filtering devices, such those used in centrifugation, the volume of the filtrate in the wells is not homogeneously distributed through the plate. Generally, the outer wells of the plate have more filtrate volume and the inner rows have the least amount of filtrate, thereby causing an uneven filtrate distribution or "smile effect", as shown in Figure 1 of the present application. The present fluid filtering device, on the other hand, has an advantage of increasing the average volume filtered during centrifugation so that the filtrate volume is substantially uniform with little well-to-well filtrate volume variability, thereby minimizing the "smile effect".

Turning now to the references cited by the Examiner, Valus discusses, as shown in its Figures 3 and 4, a flexible sealing member (20) used to seal filtering wells (12) in a microfiltration plate (10). Typically, a vacuum is drawn from below the plate to cause the filtration to occur. During the filtration process, the flexible seal (20) depresses into the wells (12) as the liquid level in each well decreases such that the seal (20) prevents air breakthrough from occurring when liquid is depleted from one or more wells. Hence, the seal maintains a substantially constant pressure differential above and below the plate.

The Examiner acknowledges that Valus does not teach the Applicants' angling mechanism, but cites Miyagi as teaching such a feature. As illustrated in Figures 7 and 8, Miyagi's angled membrane is aligned with a portion or all of the centrifugal force (V) so that the residual (4b) contained in a liquid sample (4) gradually moves in the same direction as the centrifugal force. This ensures that the residual (4b) slides on the filter membrane (12) so that a part of the filter (12a) is free from being covered with the residue (4b) to permit the solvent (4a) to rapidly pass through the filter into the filtrate chamber (C2).

Hence, Miyagi addresses a different problem than Valus: Valus, on one hand, describes sealing the filtering well with a flexible seal to maintain a pressure differential, while Miyagi, on the other hand, describes a device that prevents the filter membrane from clogging. Because these two references are directed to two entirely different problems, there is no motivation to combine the references. To prevent the use of hindsight based on the invention to defeat patentability of the invention, there must be some motivation to combine the references that create the case of obviousness. *In re Rouffet*, 149 F.3d 1350, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998). Obviousness cannot be established by merely combining the teachings of the prior art to produce the Applicants' claimed invention, absent, as in this case, some teaching, suggestion, or incentive supporting the combination. *ACS Hospital Systems, Inc. v. Monteffiore Hospital*, 732 F.2d 1572, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984).

Moreover, neither Valus nor Miyagi nor the combination of the two references identifies the problem addressed by the Applicants's invention, namely, the uneven filtrate distribution or

“smiling effect” caused by prior art filtration devices. There is no disclosure or suggestion of an angling mechanism that sets the angle of the membranes within the plurality of filtering wells at a non 90° angle relative to a line perpendicular to an axis of rotation about which the plate rotates. Although combining the teachings of Valus and Miyagi would provide a plate with angled membranes, the device would still produce the “smiling effect” during the centrifugation process, since all the membranes would be set at the same angle relative to the plate such that the outer wells of the plate would still have more filtrate volume and the inner rows would have the least amount of filtrate. Thus, the combination of Valus and Miyagi does not teach the “smiling effect” problem nor its source nor the advantages of the Applicants’ invention in solving the problem for a fluid filtering device with a plurality of filtering wells, and therefore does not render the resultant combination obvious.

Because the teachings of Valus and Miyagi cannot be properly combined to arrive at the Applicants’ invention, the rejections under 35 U.S.C. § 103(a) are therefore overcome. Reconsideration of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

New Claims 78 and 79

New claims 78 and 79 have been added to the application to alternatively define the Applicants’ invention.

New claim 78 includes the limitation that the membranes be coplanar with the plate, along with an angling mechanism that sets the angle of the membranes within the plurality of filtering wells at a non 90° angle relative to a line perpendicular to an axis of rotation about which the plate rotates. Combining Valus with Miyagi would at least result in a microfiltration plate that includes wells with filter membranes that are non coplanar relative to the plate.

New claim 79 includes an angling mechanism that sets the angle of the membranes of the wells at a respective non-zero angle relative to the plane of the plate such that , as shown in Figure 11, the respective angles decreases as the position of the respective wells increases relative to a line perpendicular to an axis of rotation about which the plate rotates. Combining

Valus with Miyagi would result in a microfiltration plate that includes wells with filter membranes that are all angled with the same angle relative to the plate.

CONCLUSION

In view of the above amendments and remarks, it is believed that all pending claims (Claims 38-45 and 50-79) are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner believes that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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MARKED UP VERSION OF AMENDMENTSClaim Amendments under 37 C.F.R. § 1.121(c)(1)(ii)

38. (Amended) A fluid filtering device comprising:

- a) a plurality of filtering wells within a plate wherein each filtering well includes a membrane for [filtering] processing a fluid; and
- b) an angling mechanism, wherein the angling mechanism sets the angle of the membranes within the plurality of filtering wells at a non 90° angle relative to a line [wherein the line is] perpendicular to an axis of rotation [of a centrifuge and passes] about which the plate rotates, the line passing through the center of a [major] plane of the plate.

52. (Amended) The device of Claim 41 further comprising a centrifuge and a swinging bucket attached to the centrifuge, wherein the plate is positioned within the bucket and the angling mechanism is placed between the center of rotation [of a centrifuge] and a base of [a] the swinging bucket [attached to said centrifuge].

60. (Amended) The [centrifuge] device of Claim 41 wherein the angling mechanism has an angle between 5° and 30°.